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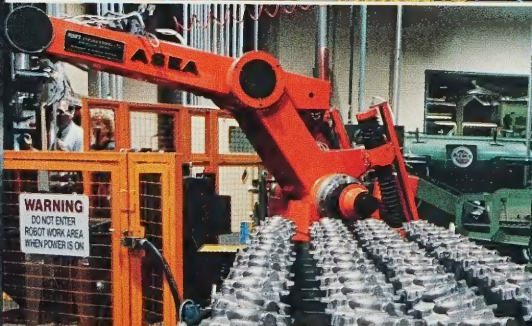
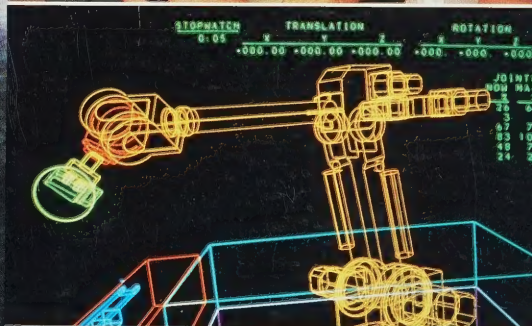
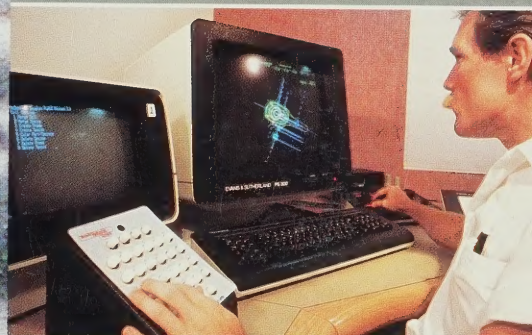


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OCAM 1986 ANNUAL REPORT



ONTARIO CENTRE
FOR ADVANCED
MANUFACTURING



PRACTICAL TECHNOLOGY
FOR
PROFITABLE SOLUTIONS

LETTER OF SUBMITTAL

Hon. Hugh P. O'Neil
Minister of Industry, Trade and Technology

Dear Minister:

I am pleased to submit to you the 1986 Annual Report of the Ontario Centre for Advanced Manufacturing (OCAM) for the fiscal year 1985/86.

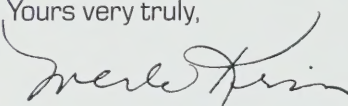
This report covers OCAM's third successful year of operation. In just three years the unquestioned technical competence of OCAM's people has earned it the respect of Ontario industry, and recognition from agencies from other provinces and countries.

The professional maturity of OCAM's staff—who have made our world-class technology centre status possible—is in no small measure due to the vision and leadership of OCAM's founding Chairman, David Braley, who retired at the end of his term in January, 1986.

I believe, Minister, that you will find the facts and case studies contained in this report indicate the increasing level of technology application and education service that OCAM is providing to our Province's industry and commerce.

We look forward to another rewarding year working with companies of all sizes and types to exploit the tremendous benefits of computer-driven design and manufacturing technology.

Yours very truly,



Merle Kriss, Chairman

ONTARIO CENTRE FOR ADVANCED MANUFACTURING

OCAM'S MISSION

■ To accelerate the effective utilization of advanced manufacturing technology and to encourage the growth of supportive industries in order to improve the productivity and competitiveness of Ontario industry and commerce.

STRUCTURE

■ OCAM is an Ontario Crown corporation offering its clients professional, unbiased assistance and technical support in the practical application of CAD/CAM/CAE/CIM and factory automation technologies on a fee-for-service basis.

■ We operate three technology applications Centres, employing almost 100 skilled and experienced professionals and support staff.

- the Ontario CAD/CAM Centre — Cambridge; deals primarily with the use of computer-aided design (CAD), computer-aided manufacturing (CAM), computer-aided engineering (CAE) and computer-integrated manufacturing (CIM);
- the Ontario Robotics Centre — Peterborough; deals primarily with manufacturing engineering and advanced automation in manufacturing;
- the Canada-Ontario Centre for Advanced Manufacturing — Windsor;

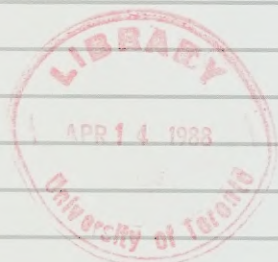
jointly funded by the Federal Government to provide consulting service to local industry and keep abreast of technology developments in Michigan.

PROGRAMS

- in-plant opportunity studies to identify automation opportunities for improved production and product quality
- feasibility studies, in-depth conceptual engineering studies and system demonstration projects
- detailed CAD/CAM hardware, software and support specifications and benchmarks to be used in system evaluation and selection
- cost-benefit estimates, payback and financial justification
- implementation plans reflecting new procedures, staff training and interfaces to existing systems
- system installation and start up; continuing programs for expansion of automation in a client's business.
- customized, in-plant training assistance and operator training on CAD/CAM and advanced manufacturing systems at OCAM's three centres.
- frequent seminars and workshops on the profitable application of robotics and advanced manufacturing; computer-aided design and manufacturing.



MERLE KRISS, Chairman



SOLID GROWTH

Over the year:

- Contracts were signed with over 450 Ontario firms, a doubling from the previous year.
- Over one-third of contracts were with small companies (under 100 employees).
- Revenue grew by 42% to more than \$3-million, with a sizeable upsurge in orders in the final quarter that has carried over into the new year.

EXPANDING EXPERTISE

During 1986, OCAM's expanding expertise helped the organization make major inroads into two new industry sectors:

- **A/E/C**—The CAD/CAM Centre hosted Canada's first design automation conference and exposition for the architecture, engineering and construction sector. Attendance over the three-day event approached 1,000. The Centre now has architectural and engineering experts on staff and offers a full range of consulting services and seminars.
- **Electronics**—Both the Ontario CAD/CAM Centre and the Ontario Robotics Centre have established automation expertise in electronics. A range of seminars are also offered.
- **Expansion**—The Robotics Centre added almost 9,000 square feet to make room for new equipment and to enlarge its seminar facilities. The CAD/CAM Centre added 10,000 square feet, mostly for a new training and demonstration area devoted to microcomputer-based CAD systems.

COMMITMENT TO SMALL BUSINESS

With the steadily decreasing cost of electronic components, controls and computers, more small companies are taking their first step into automation. But new technology still poses considerable risk for the small firm with little or no technical expertise, so OCAM has developed new programs to reduce the fear and risk involved in automating:

- **The Opportunity Survey**—For a set fee, industry-experienced engineers identify specific opportunities where advanced manufacturing technology could mean savings or improvements.

■ **Tech Talk**—Over 250 companies have participated in OCAM's highly successful one-on-one free technology consulting clinics held periodically around the province.

■ **Manufacturing Affiliates**—This program establishes a long-term relationship between the small company and OCAM's unbiased technicians and engineers. It combines an in-plant check-up, technology update, seminar discounts and ongoing consulting—all at one set price.

TECHNOLOGY AWARENESS AND UNDERSTANDING

Building understanding of new technology and its many benefits is the first step towards convincing manufacturers to use it. For its part, OCAM has aggressively promoted the benefits of CAD/CAM, robotics, and the various other advanced manufacturing tools and techniques. During 1985/1986, OCAM:

- Expanded its seminar program by working with over 30 industry associations to tailor specific offerings to the needs of the different industry sectors. Over 80 seminars were held last year, attracting 2,745 people.
- Sponsored, organized and hosted a number of important trade shows and conferences in cooperation with other technology centres, colleges, universities and professional associations.
- Designed and installed, with the help of several subcontractors, a highly successful robotic assembly workcell for an autoparts manufacturer. Not only did this special demonstration project attract national press coverage, but hundreds of copies of an OCAM produced video have been circulated to manufacturers, professional groups, television stations, colleges and universities.
- Contributed regularly to numerous industry, business and association publications. Special emphasis was placed on the technology "case-study" approach—promoting companies with real world experience.

■ Spearheaded the formation of the Canadian MAP Interest Group, a high-profile industry association that has actively promoted Manufacturing Automation Protocol (MAP) a groundbreaking multi-vendor computer communications specification for the factory floor.

YEAR IN REVIEW

SELF-FUNDING RATIO

1985/86	1984/85	1983/84
36%	31%	14%

NUMBER OF CONTRACTS

1985/86	1984/85	1983/84
451	221	85

REVENUE

1985/86	1984/85	1983/84
\$3,069,000	\$2,165,000	\$607,000

CLIENT REPORT



LARRY ZEPF, PRESIDENT OF **ZEPP**

TECHNOLOGIES, KITCHENER, A SMALL

MANUFACTURER OF CUSTOM MACHINES

FOR BOTTLING PLANTS. THE ONTARIO

CAD/CAM CENTRE HELPED THIS RAPIDLY-

GROWING FIRM LEARN ABOUT AND SELECT

A CAD/CAM SYSTEM.



DEAN MATSUMOTO, A DESIGNER WITH

MARSHALL CUMMINGS & ASSOCIATES,

A TORONTO INTERIOR DESIGN FIRM. WITH

THE HELP OF THE ONTARIO CAD/CAM

CENTRE, MARSHALL CUMMINGS IS NOW

MAKING PLANS TO CONVERT FROM

MANUAL DRAWING TO COMPUTER-

AIDED DESIGN.

The Ontario Centre for Advanced Manufacturing was set up to encourage the wider use of advanced design and manufacturing technology. This includes CAD/CAM, robotics and numerous other tools and techniques.

Computer-aided design and computer-aided manufacturing (CAD/CAM) has been in use for over 20 years but only recently has its potential to revolutionize manufacturing been recognized. CAD merges computer technology with mechanical drawing to reduce repetitive work and greatly enhance design capabilities. CAM refers to the use of computers in various forms in the manufacturing process. CAD/CAM is the linking of the two, combining all the processes necessary to translate ideas into final products.

Robotics is an important component of flexible manufacturing. Other tools include factory simulation systems, automated inspection, programmable logic controllers — virtually any computerized equipment on the shop floor. Flexible is the key word. Advanced manufacturing tools can be easily reprogrammed to switch jobs and applications and are therefore ideally suited for today's rapidly changing marketplace.



THIS ROBOTIC ASSEMBLY WORKCELL, CONCEIVED AND DESIGNED BY THE ONTARIO ROBOTICS CENTRE, MORE THAN DOUBLED OUTPUT AND IMPROVED QUALITY AT ECHLIN CANADA INC., OF REXDALE. AS A RESULT, THE BRAKE COMPONENT MANUFACTURER HAS GONE TO A THIRD SHIFT, CREATING 60 NEW JOBS.

WEGU CANADA LTD. is a small Whitby, Ont., firm which manufactures rubber automotive parts. Wegu's introduction to computerized manufacturing arrived unexpectedly on the desk of General Sales Manager Klaus Luddemann in the form of an RFP (request for proposal) for a fairly routine automotive part from an important client. What made Luddemann take special notice was that it specified Wegu's design be provided in CAD form.

Luddemann knew very little about CAD so he turned for help to the Ontario CAD/CAM Centre. As he looked on, one of the Centre's skilled operators quickly entered the information into a CAD/CAM system and created a three dimensional model of the part that was displayed in colour on a terminal.

"In less than two days I had a computer tape in my hands which provided all of the information requested in the RFP and was completely compatible with their requirements," says Luddemann. "What really impressed me, though, was the amount of manufacturing information that the model contained. Just by pressing a few buttons we were also able to calculate the volume of the part, and therefore the amount of material that would be required to produce it."

After identifying six areas in **R. REININGER AND SON LTD.'S** Newmarket plant where the company could improve its production methods and efficiency, the Robotics Centre was called upon to do a more detailed study of one of the areas. This involved the use of a mechanical arm for automating secondary press operations.

The advantages of the project for the autoparts manufacturer? Increased flexibility, greater operation speed and improved safety for Reininger employees working on that particular job.

Although the benefits of advanced manufacturing are substantial, they are sometimes more difficult to tabulate than traditional automation. In Reininger's case, however, the project has a simple 18-month payback. As a result, the necessary equipment will soon be installed.

DOMINION AUTOMOTIVE ACCESSORIES LTD., of Toronto, contracted with the CAD/CAM Centre to develop on a computer screen a 3-dimensional model of a rear view mirror, one of Dominion Automotive's typical products. The precision and

efficiency of the demonstration convinced the company to proceed with plans to purchase a CAD/CAM system.

CAD/CAM Centre engineers then performed a needs analysis for the company, reviewing its engineering, design, drafting, analysis and manufacturing procedures to identify areas where CAD/CAM technology could reduce costs or improve quality. Finally, CAD/CAM Centre consultants helped Dominion Automotive evaluate the different systems on the market, narrowing the field to those that best met the company's needs and budget.

ESCO LTD. is committed to quality improvement. That's why the company called in the manufacturing technology engineers at the Ontario Robotics Centre to survey its Port Hope plant and identify specific opportunities where new technology could bring savings or improvements.

Although the survey indicated that the company was using up-to-date technology in manufacturing parts for earth moving equipment, Esco Vice President John Hemmingsen described the Robotics Centre work as excellent value.

"The people from the Centre did a good job understanding our business. They came up with practical recommendations to improve quality and productivity," he says.

NUMET ENGINEERING of Peterborough was contracted by the Robotics Centre to build a robotic assembly workcell for one of the Centre's clients. For Numet, which has considerable expertise in designing and manufacturing products for the nuclear power industry, this was their first robotics project.

"Most robots cannot merely be purchased and installed on a plant floor," says Numet Vice President Bob Williamson. "In many cases they must be integrated into a production system and that's where companies like Numet can provide the engineering expertise to make the system work."

As a result of the experience gained on the project, Numet was able to land another contract for robotic workcell design and manufacture, according to Mr. Williamson.

"We hope that ultimately this will lead to further expansion of our manufacturing division and the addition of skilled workers," he adds.

The Ontario Robotics Centre also sub-contracted with **COATES INDUSTRIAL AUTOMATION LTD.**, of Ancaster, to build the vibratory parts feeder and other ancillary equipment for the robotic workcell.

Every time **H.J. HEINZ COMPANY LTD.**, of Leamington, manufactures a new food product the company must engineer a new process and that means producing mechanical, electrical, control and process drawings.

Says Victor Rivest, Heinz Manager of Engineering: "This often requires redrawing existing process components in a new configuration. Architectural modifications and additions also require new drawing. As a result, we're in an almost continuous state of change that creates major rework for draftsmen and planners.

After studying the problem, the Windsor Centre recommended Heinz purchase a CAD system that will enable the company to make changes more quickly and economically.

"What we got for our money was practical, unbiased advice—sensible solutions to the right questions," Rivest explains.

BUTLER MANUFACTURING CO. CANADA LTD., of Burlington, requested the CAD/CAM Centre evaluate its present and future needs for computer-aided design and drafting (CADD) in conjunction with a manufacturing information system (MIS).

As a result of the study, the company, which manufactures steel building systems and energy management controls, is now looking at taking its first steps towards computer integrated manufacturing.



BOB WILLIAMSON, VICE PRESIDENT OF NUMET ENGINEERING, OF PETERBOROUGH. THROUGH AN ONTARIO ROBOTICS CENTRE SUBCONTRACT TO BUILD A ROBOTIC ASSEMBLY WORKCELL, NUMET MADE A SUCCESSFUL ENTRY INTO THE LUCRATIVE ROBOTICS FIELD.

CLIENT REPORT



GEORGE LOWRY, PRESIDENT OF NW CLAYTON COMPANY LTD., OF GUELPH. THE ONTARIO CAD/CAM CENTRE HELPED THIS HIGH-QUALITY METAL FABRICATION COMPANY ADD CAD/CAM TO ITS EXISTING INVENTORY OF SOPHISTICATED MANUFACTURING TOOLS, WHICH INCLUDE ROBOTICS AND PLASMA ARC CUTTING.



TONY SPOORE, CLIENT SERVICES MANAGER OF THE ONTARIO ROBOTICS CENTRE, DISCUSSES A FACTORY AUTOMATION POSSIBILITY WITH A MANUFACTURING CLIENT AT ONE OF OCAM'S "TECH TALK" SESSIONS—A FREE, ONE-ON-ONE CONSULTING CLINIC.

CLIENT REPORT



CLIFF HOWARTH, OPERATIONS MANAGER,
SHELLER-GLOBE OF CANADA, HOLDS ONE
OF THE MANY TYPES OF STEERING WHEELS
THE COMPANY PRODUCES. THE ONTARIO
ROBOTICS CENTRE HAS UNDERTAKEN A
VARIETY OF FACTORY AUTOMATION
CONTRACTS FOR THIS SOUTHWESTERN
ONTARIO FIRM.



RON LIPSCOMBE (SEATED), A MECHANICAL
DESIGNER AT THE ONTARIO ROBOTICS
CENTRE, DEMONSTRATES THE
SOPHISTICATED GRAPHICS CAPABILITY OF
COMPUTER SIMULATION. THE CENTRE
HELPED GENERAL MOTORS DESIGN A
COMPLICATED ROBOTIC SYSTEM, USING
COMPUTER SIMULATION, TO APPLY
SEALANT TO CAR BODIES.

GENERAL MOTORS OF CANADA turned to the Robotics Centre for assistance in planning a complicated robotic system to apply sealant to car bodies. Up to eight robots were included in each sealant workcell, in addition to two vision systems and a car track.

Using three dimensional wire-frame graphic display models to represent the robots, equipment, workpieces and tooling on a computer screen, the Robotics Centre was able to simulate three different design proposals for the sealant system. The simulation made it possible to select the best robot, determine optimum robot placement, and predict accurate cycle time. This information made it possible to identify the best design.

According to Ron Lipscombe, a mechanical designer at the Centre, using computer graphics to simulate robots and components is an efficient and economical means of designing robotic workcells.

"Variations to the design concept can be quickly made and the results shown on the screen," he says. "Equipment can be selected and performance evaluated long before a cent is spent on capital equipment."

ELECTROHOME ELECTRONICS

manufactures computer monitors, video projection systems, printed circuit boards, and related products. It is a growing firm with considerable engineering expertise.

Yet when the Kitchener, Ont., company began looking at CAD/CAM and CAE (computer assisted engineering) technology, the company opted to call in the experts from the Ontario CAD/CAM Centre. Electrohome needed the Centre's expertise to devise a CAD/CAM strategy and select a system which would meet the needs of the various groups within the organization.

Centre engineers provided full-cycle assistance, undertaking a needs analysis, devising a strategy, assisting in the selection process and composing an implementation plan. The company is now installing a CAD/CAM system, and is confident that its new system will improve productivity as well as design quality.

M.B.M. CERAMICS, of Downsview, Ont., is a small but rapidly-growing producer of ceramic bathroom fixtures such as soap dishes, towel holders and toilet tissue holders. Faced with increasing competition, particularly from the Japanese, M.B.M. Ceramics opted to modernize rather than abandon the ceramics business.

The Canadian-owned company turned to Contromatic, a Toronto engineering and equipment company, and to the Ontario Robotics Centre to help it streamline and improve its production process. With an extensive conveyor system, and using a highly-efficient microwave dryer and a flexible robotic system, M.B.M. is now expanding its product line and winning market share from the Japanese. It is also beginning to make inroads into the U.S. market.

TELESAT CANADA's TV and radio satellite ground stations are bringing Vancouver's Expo '86 to millions of people across the country this summer. The company uses CAD to handle its drafting and documentation needs for the more than 1200 stations it operates in Canada and around the world.

Telesat drafting supervisor Ray Delahunt felt that "CAD was rapidly becoming essential for us to keep up with demand as we grow." After looking at many different systems, Delahunt took his short list of choices to be evaluated at the Ontario CAD/CAM Centre.

Soon after, Telesat selected and purchased a system and then called on the Centre to train its draftsmen on using the equipment. Says Delahunt, "The course was custom tailored to our needs. The Centre's staff is very accessible; they provided us with practical useful information."

It is no exaggeration to describe the Robotics Centre as virtually an extension of **SHELLER-GLOBE OF CANADA's** engineering department. The Southwestern Ontario steering wheel manufacturer has contracted with the Centre on a variety of increasingly sophisticated assignments.

CLIENT REPORT

These included everything from detailed plant-wide opportunity surveys through conceptual studies for particular equipment to its actual implementation. The Centre's engineers have also helped the company replan material flow and equipment layout.

Why the multiple contracts? Operations Manager Cliff Howarth describes the Centre's work as "very complete. It's very easy to sell the reports to upper level management."

Combining low cost with high quality is the only way to survive in the fiercely competitive computer terminal industry. **KEYNOTE COMPUTER PRODUCTS**, of Waterloo, came to the CAD/CAM Centre to see whether it was possible to devise a very complex printed circuit board that would help the company stay competitive.

With help from CAD/CAM Centre staff, Keynote Computer President Blair McKay designed the new board and now regularly visits the Centre when developing new products.

With the assistance of the Ontario Robotics Centre, **WESTINGHOUSE CANADA INC.**, of Hamilton, is making a solid effort to prepare its employees for the gradual transition to flexible automation.

The large manufacturer of electrical and electronic components has established its own in-house robotics centre

and contracted with the Ontario Robotics Centre to develop a workshop program that would help its employees understand what technology can and cannot do. The company also requested an approach that would reassure workers that these tools will help make jobs more secure, not replace them with machines.

"We're making sure that Westinghouse continues to be a leader in the adoption of advanced technology, and that our employees welcome new automated production equipment and techniques," says Westinghouse manufacturing consultant Gerhard Kasproicz.

NACAN PRODUCTS LTD., of Collingwood, which produces industrial starches, decided to consolidate their technical drawings on a single database after attending a seminar at the CAD/CAM Centre.

As a result, Nacan approached **KILBORN CONSULTING ENGINEERS AND ARCHITECTS**, one of the presenters at the seminar. Kilborn has since helped Nacan digitize in excess of 60 drawings, ranging through flow diagrams, material balance to plant layout, structural, civil and electrical drawings.

Through its involvement with the Centre and with Kilborn, Nacan Products is now making plans for the acquisition of its own CAD/CAM system.



HANK DUSELDORP, GENERAL MANAGER,

M.B.M. CERAMICS, OF TORONTO. A SMALL

BUT GROWING PRODUCER OF CERAMIC

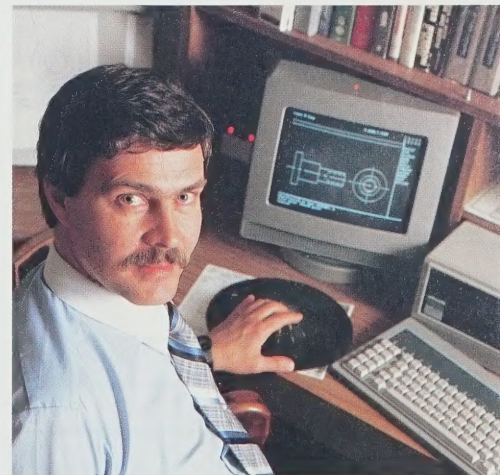
BATHROOM PRODUCTS SUCH AS SOAP

DISHES, M.B.M. CERAMICS CALLED ON THE

ONTARIO ROBOTICS CENTRE TO HELP IT

STREAMLINE AND IMPROVE ITS

MANUFACTURING PROCESS.



BERNIE DEL RIO, ENGINEERING MANAGER,

KENEBUC LTD., OF CAMBRIDGE. THE

ONTARIO CAD/CAM CENTRE HELPED

KENEBUC, AN AUTOPARTS SUPPLIER,

SELECT A MICRO COMPUTER-BASED

CAD SYSTEM.

ONTARIO CENTRE FOR ADVANCED MANUFACTURING

**ONTARIO
ROBOTICS
CENTRE**

**ONTARIO
CAD/CAM
CENTRE**

**CANADA—
ONTARIO CENTRE
FOR ADVANCED
MANUFACTURING—
WINDSOR**

OCAM OPERATES THREE TECHNOLOGY APPLICATIONS CENTRES IN ONTARIO: ONTARIO ROBOTICS CENTRE, PETERBOROUGH; ONTARIO CAD/CAM CENTRE, CAMBRIDGE; CANADA-ONTARIO CENTRE FOR ADVANCED MANUFACTURING, WINDSOR.

FINANCIAL STATEMENTS

AUDITORS' REPORT

TO THE BOARD OF DIRECTORS

OF THE ONTARIO CENTRE FOR

ADVANCED MANUFACTURING AND THE

HONOURABLE MINISTER OF INDUSTRY, TRADE

AND TECHNOLOGY

We have examined the financial position of the Ontario Centre for Advanced Manufacturing as at March 31, 1986 and the statements of operations, equity, and changes in financial position for the year then ended. Our examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as we considered necessary in the circumstances.

In our opinion, these financial statements present fairly the financial position of the corporation as at March 31, 1986 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied, after giving retroactive effect to the change in accounting policy as outlined in note 6, on a basis consistent with that of the preceding year.

Cambridge, Ontario
May 14, 1986

Kelly Graham Myke & Partners Chartered Accountants

ONTARIO CENTRE FOR
ADVANCED MANUFACTURING
FINANCIAL POSITION
March 31, 1986

	1986	1985
ASSETS		
Cash	391,400	55,022
Accounts receivable, trade	785,948	789,209
Accounts receivable, Province of Ontario	57,620	618,021
Work in process	67,336	261,096
Prepaid expenses	54,697	38,653
Current Assets	1,357,001	1,762,001
Fixed assets (note 4)	5,788,549	5,571,219
	<u>\$7,145,550</u>	<u>\$7,333,220</u>

LIABILITIES

Accounts payable, trade	1,315,369	1,711,961
Deferred revenue	41,632	50,040
Current Liabilities	1,357,001	1,762,001

EQUITY

5,788,549	5,571,219
<u>\$7,145,550</u>	<u>\$7,333,220</u>

The explanatory financial notes form an integral part of these financial statements.

Approved on behalf of the board

Meredith Director
W. A. Hooper Director

ONTARIO CENTRE FOR
ADVANCED MANUFACTURING
STATEMENT OF EQUITY
Year ended March 31, 1986

	1986	1985
Balance at beginning of year	5,571,219	5,121,673
Contributions for capital assets		
Province of Ontario (Note 1(D) and 5)	1,526,647	1,730,220
Government of Canada (Note 1(E))	495,769	100,000
	7,593,635	6,951,893
Transfer to operations (Note 5)	1,805,086	1,380,674
Balance at end of year	<u>\$5,788,549</u>	<u>\$5,571,219</u>

The explanatory financial notes form an integral part of these financial statements.

FINANCIAL STATEMENTS

ONTARIO CENTRE FOR ADVANCED MANUFACTURING STATEMENT OF OPERATIONS Year ended March 31, 1986

	1986	1985
REVENUE		
Consulting revenue	2,506,228	2,026,384
Demonstration project revenue	489,251	
Interest income	73,493	138,211
	3,068,972	2,164,595
EXPENDITURE		
Salaries and benefits	3,954,600	3,081,464
Demonstration project costs	577,982	
Recruiting and relocation	142,522	143,549
Professional and consulting fees	348,593	365,285
Occupancy and office	809,051	679,361
Technology advancement and travel	867,174	743,303
Marketing and communications	736,102	741,581
Workshops, seminars and exhibitions	321,675	232,063
Equipment rental and time sharing	37,354	34,158
Maintenance	468,097	326,517
Depreciation and amortization	1,805,086	1,380,674
Other	126,086	145,888
	10,194,322	7,873,843
Excess of expenditure over revenue	7,125,350	5,709,248
Contribution from the Province of Ontario for operating purposes (notes 1(D) and 5)	7,125,350	5,709,248
	\$NIL	\$NIL

	1986	1985
Working capital was provided by		
Operations		
Revenue	3,068,972	2,164,595
Contribution from Province of Ontario for operating purposes	7,125,350	5,709,248
Add (Deduct) items not affecting working capital		
Depreciation and amortization	1,805,086	1,380,674
Transfer from equity	(1,805,086)	(1,380,674)
	10,194,322	7,873,843
Contributions for capital assets		
Province of Ontario	1,526,647	1,730,220
Government of Canada	495,769	100,000
Proceeds from sale of fixed assets	30,607	36,948
	\$12,247,345	\$9,741,011
Working capital was used for		
Operations	10,194,322	7,873,843
Additions to fixed assets	2,053,023	1,867,168
	\$12,247,345	\$9,741,011

ONTARIO CENTRE FOR ADVANCED MANUFACTURING STATEMENT OF CHANGES IN FINANCIAL POSITION Year ended March 31, 1986

The explanatory financial notes form an integral part of these financial statements.

FINANCIAL STATEMENTS

ONTARIO CENTRE FOR
ADVANCED MANUFACTURING
EXPLANATORY FINANCIAL NOTES
Year ended March 31, 1986

1. SIGNIFICANT ACCOUNTING POLICIES

This summary of the major accounting policies of the corporation is presented in order to assist the reader in evaluating the financial statements contained herein. These policies have been followed in all material respects for the periods covered:

(A) INTEREST INCOME

Interest income earned on cash on deposit is recorded on the accrual basis whereby income earned but not received at March 31 is recorded in these financial statements.

This interest income is applied to reduce the annual operating expense / allocation from the Province of Ontario during the year.

(B) INVESTMENT IN FIXED ASSETS

The acquisition costs of major additions and improvements are capitalized and expenditures for maintenance and repairs which do not improve or extend the useful life of the respective assets are charged to operations.

At the time of disposal or retirement of fixed assets, the cost of the asset and related accumulated depreciation are removed from the accounts and the resulting gain or loss is reflected in the 'depreciation expense' in the statement of operations.

Depreciation and amortization are calculated on a basis designed to amortize the cost of the assets over their estimated economic lives as follows:

Technical, office equipment and furniture and fixtures — 5 year straight-line
Leasehold improvements — Term of leases

(C) RECOGNITION OF INCOME

Income and expenditures are recognized and recorded in these financial statements utilizing the accrual method whereby income is recorded when earned and expenditures are recorded when incurred. Revenue received which is unearned is shown as deferred revenue in the statement of financial position.

(D) CONTRIBUTIONS FROM THE PROVINCE OF ONTARIO

The corporation receives funds quarterly in advance for operating and capital purposes from the Province of Ontario.

The operating funds offset current net operating expenditures and accordingly are presented in the statement of operations. The capital funds which relate to the acquisition, net of capital disposals, of high technology equipment and other capital items are presented in the statement of equity and recognized as income as the depreciation on the related assets are charged against operations.

(E) CONTRIBUTIONS FROM THE GOVERNMENT OF CANADA

During fiscal 1985, the corporation entered into an agreement with the Department of Regional and Industrial Expansion (DRIE) of the Federal Government to jointly fund along with the Province of Ontario the corporation's new centre located in Windsor, Ontario.

Operating funds relating to operating expenditures are presented in 'Consulting revenue' in the Statement of Operations and capital funds are included in the Statement of Equity.

(F) WORK IN PROCESS

Inventory of work in process represents consultants' time and other project costs on client projects at estimated net realizable value.

(G) PENSION PLAN

Employees become members of the corporation's pension plan after completing one year of continuous service at which time employer contributions are made retroactive to date of commencement of employment.

The Centre accrues pension costs for employees from the date of their employment regardless of whether or not they have vested with the employee at the year end.

2. BASIS OF OPERATIONS

Effective November 17, 1982, the Ontario Centre for Advanced Manufacturing was established as a Schedule II Crown Agency without share capital by an act of the Ontario legislature.

The objective of the corporation is to accelerate the utilization of advanced manufacturing technology through programs promoting both awareness and applications and to encourage the growth of supportive advanced manufacturing industries in order to improve the productivity and competitiveness of Ontario industry and commerce.

In order to accomplish these objectives the corporation has established three operating centres. The Robotics and CAD/CAM Centres were opened in fiscal 1983 and the Windsor Centre was opened in fiscal 1985.

3. COMMITMENTS

The corporation has entered into net-net lease arrangements for its four operating locations in Peterborough, Cambridge, Rexdale and Windsor which require an annualized lease payment of approximately \$234,000 (\$178,000 in 1985).

The corporation has options to renew these facility leases at negotiated terms and rates.

OFFICERS

4. FIXED ASSETS

	Cost	Accumulated Depreciation
Technical equipment	5,915,082	2,021,910
Office equipment	959,846	268,365
Furniture and fixtures	768,621	293,238
Leasehold improvements	1,736,393	1,007,880
	<u>\$9,379,942</u>	<u>\$3,591,393</u>
	1986	1985
	Net	Net
Technical equipment	3,893,172	3,801,234
Office equipment	691,481	558,565
Furniture and fixtures	475,383	465,139
Leasehold improvements	728,513	746,281
	<u>\$5,788,549</u>	<u>\$5,571,219</u>

5. CONTRIBUTIONS FROM PROVINCE OF ONTARIO

	1986	1985
Total contributions during year	6,846,911	6,058,794
Transfer from equity	1,805,086	1,380,674
	<u>8,651,997</u>	<u>7,439,468</u>
Amount assigned to capital assets	1,526,647	1,730,220
Contributions to operations for year.	<u>\$7,125,350</u>	<u>\$5,709,248</u>

6. CHANGE IN ACCOUNTING POLICY

In 1986, the corporation adopted retroactively the policy whereby contributions for capital assets are recognized as income in the statement of operations in amounts equal to the depreciation and amortization charged on the related fixed assets.

As a result of this change in policy, the "Contribution from the Province of Ontario for operating purposes" has been increased by \$1,805,086 (\$1,380,674 in 1985).

7. TECHNOLOGY UPGRADING FOR MANUFACTURERS' PROGRAM

Funds received from the Province of Ontario in the amount of \$89,516 under the Technology Upgrading for Manufacturers' program (TUM) on behalf of TUM participants and subsequently disbursed to them are netted for financial statement presentation purposes. Accordingly, these amounts are not presented in the Statement of Operations.

KENNETH H. JONES, P.Eng., President

Ken Jones earned his P.Eng. (Mechanical) at McGill University and undertook post-graduate studies at University of Michigan. He spent 17 years with Ford Motor Company of Canada in progressively senior management positions. He moved to Hawker-Siddeley as General Manager of its Canadian Car, Fort William Division and later was appointed Vice-President of Husky Injection Molding Systems. He became president and chairman of Standard-Modern Tool Company in 1975. Ken is currently president of The Canadian MAP Interest Group (CMIG).

IAN A. BARRIE, P.Eng., Vice-President & General Manager, Ontario Robotics Centre

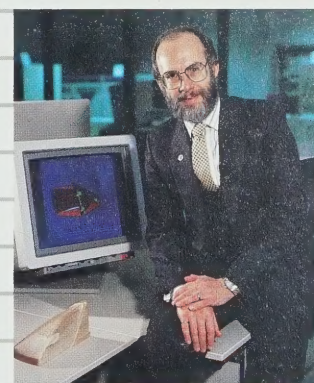
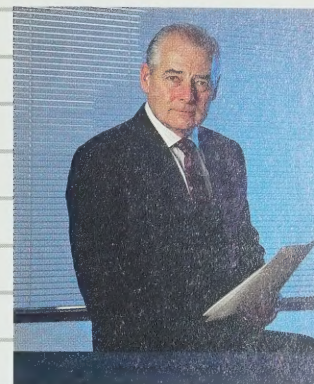
Ian Barrie received his Bachelor of Mechanical Engineering degree from General Motors Institute, followed by his MBA from University of Western Ontario. He accumulated a wide range of experience over 19 years in various departments of General Motor's Assembly and Fabrication Plants in Oshawa. Most recently, he was General Superintendent of Manufacturing at the Fabrication Plant, responsible for several production departments, maintenance and plant engineering.

JOHN R. RICHARDSON, P.Eng., Ph.D., Vice-President & General Manager, Ontario CAD/CAM Centre

John Richardson obtained his B.Sc. (Engineering Physics) at Queen's University, followed by his M.Sc. (Solid State Physics) at McGill University. He earned his Ph.D. in Physics from the University of Waterloo. Following several years in various divisions of General Electric, he became General Manager, Mechanical Division, at John T. Hepburn in Toronto. He then founded his own company, Altus Management Systems, to provide services in MIS, advanced technology and operations management to manufacturers.

E. THOMAS DALTON, C.A., Vice-President, Finance & Administration

Tom Dalton has over 15 years of experience as a professional auditor, manager, and consultant. Prior to joining OCAM, he was a partner with Ernst & Whinney Management Consultants. During nine years with Ernst & Whinney, Mr. Dalton held a number of senior positions, including responsibility for Management Consulting Services in their Ottawa Office.



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TO ASSIST ONTARIO INDUSTRY TO MEET
THE COMPETITIVE CHALLENGE

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